

SOFTWARE USER GUIDE

WISE BOARD



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Chapter 1

OVERVIEW

1 Introduction

The i.MX6 VISE Board is a PoP technology based EVM design built around the powerful i.MX6 Dual/Quad Core, ARM Cortex A9 SoC from Freescale. Based on dual architecture, the VISE Board consists of a Core module and a Carrier module. The Core Module is plugged to Carrier module through Expansion Header.

The i.MX6 VISE Board explores the powerful features of the i.MX6 Quad processor enabling maximum interfaces for development.

1.1 Purpose and Scope

The purpose of this document is to explain the software released by Mistral for the i.MX6 VISE Board. It explains the host and target requirements, procedures for flashing boot loader, Linux kernel and Yocto file system in SD and MMC card and executing tests for interfaces supported by the EVM.

This document explains only the software details of the i.MX6 VISE board. Please refer to the Hardware User Guide of i.MX6 VISE Board for hardware related details.

1.2 Overview

This document explains the usage of software released by Mistral Solutions for i.MX6 VISE Board. We assume that the readers have basic knowledge of Linux commands and Linux environment.

Chapter 2

SAFETY PRECAUTIONS

2 General Safety Precautions

2.1 ESD Precautions

The VISE Board contains devices, which are sensitive to Electro-Static Discharge. Improper handling may lead to performance degradation of the devices or even permanent damage.

2.2 Equipment Safety

- Wear ESD coat while handling the board.
- Keep the board on ESD cover to prevent it from ESD issues.

Chapter 3

WISE BOARD SOFTWARE REQUIREMENTS

3 Host and Target Requirements

3.1 Host Requirements

- Intel Pentium class processor
- Windows 7, VMware with Ubuntu 12.04 image as development system or an Ubuntu 12.04 and above Linux Host system.
- 2GB or more RAM
- Minimum of 250 GB of free hard disk space.
- Minicom2.6 for Ubuntu 12.04 and above or TeraTerm for windows.

3.2 Target Requirements

- i.MX6 VISE Core Module
- i.MX6 VISE Carrier Module
- Universal Power Supply (15W, 5V, Center Positive)
- AC Power Cord
- HDMI OUT display with power supply
- HDMI cable (HDMI TYPE A male to TYPE A male cable)
- USB micro-B cable - 2Nos
- USB OTG cable (USB Type A Female to Micro A Male cable)
- Stereo Headphones(3-pin, 3.5mm)
- Microphone
- Ethernet cable (RJ 45 Cable)
- USB stick
- 8GB SDHC card
- TFC-U9700LTWV50TC-01A display (has LCD, touch screen & backlight)

3.3 Software Prerequisites

All the below test utilities are available as part of Linux rootfs. Linux root filesystem will be available as part of i.MX6 VISE SDK downloadable from mistral website.

- ALSA utilities imported file system
- inv_mpu9150_test.sh (9-Axis sensor script)

- evtest
- 16-bit, 1024x768 & 1920x1024 resolution, rgba formatted sample file (lcd_image.omap16, hdmi_image.omap16)
- Sample audio files (.wav format)
- als_max44009_test.sh

Chapter 4

WISE BOARD HARDWARE SET UP

4 Hardware Setup

4.1 Hardware setup

- Connect USB micro-B cable from VISE core board (J1 port) to Host PC.
- Connect LCD panel on J24, backlight connector on J22 & touch screen connector on J26 port of VISE Board / or Carrier Module of the VISE Board.
- Connect HDMI cable from HDMI display to J3 port of VISE Board / or Carrier Module of the VISE Board
- Connect Headphone on J1 port and Microphone on J2 port of VISE Board / or Carrier Module of the VISE Board
- Open minicom /dev/ttyUSB0 port with 115200 8N1 parameters.
- Connect 5V power supply on J20 port of VISE Board / or Carrier Module of the VISE Board

4.2 Block Diagram

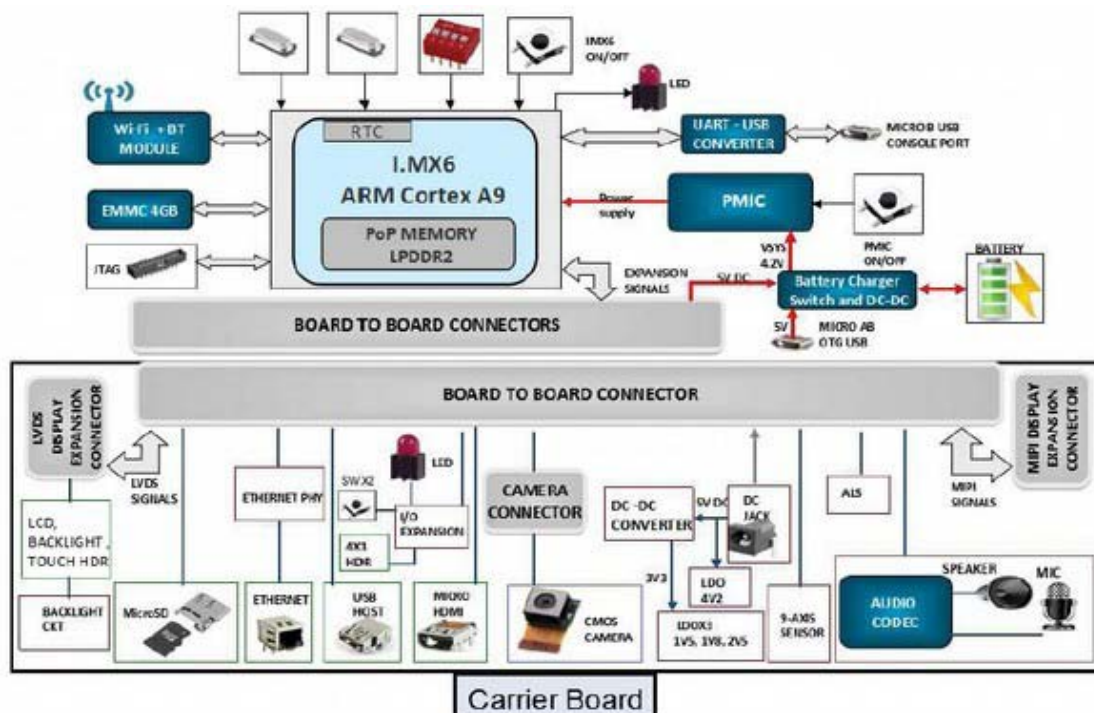


Figure 1: VISE BOARD Block Diagram

4.3 Physical View - Top side

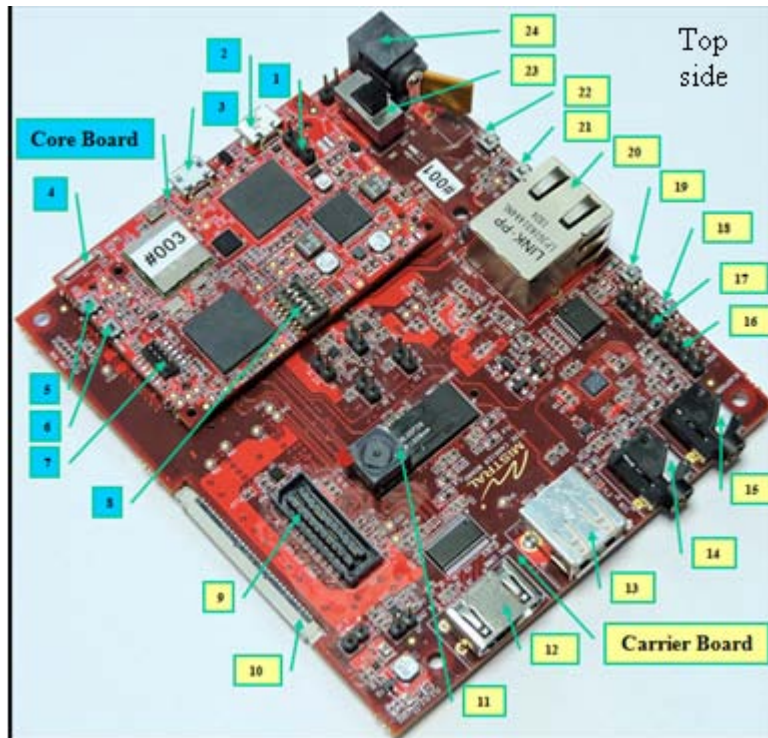


Figure 2: VISE Board Physical View - Top side

4.4 Physical View - Bottom side

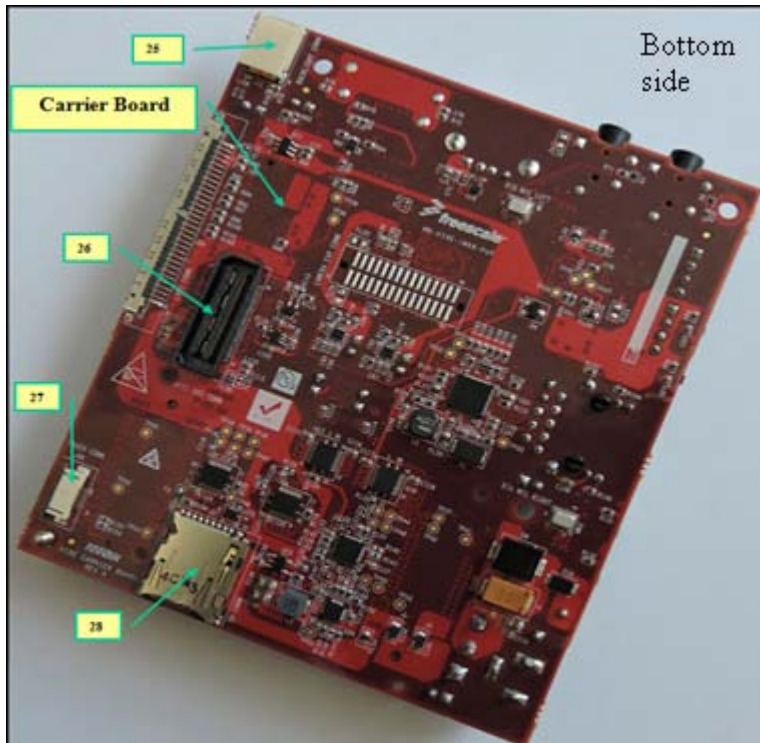


Figure 3: VISE Board Physical View - Bottom side

#	CORE mODULE	Ref.
1	Battery header	J3
2	USB OTG	J2
3	USB serial console	J1
4	WLAN/BT antenna	A1
5	Reset	SW1
6	Processor On/Off	SW2
7	JTAG header	J4
8	Boot select SW	SW3

#	CARRIER MODULE	Ref.
9	LVDS expansion Conn	J10
10	LVDS Conn	J24
11	Camera module Conn	J11
12	HDMI Conn	J3
13	USB type A Conn	J4
14	Mic jack	J2
15	Headphone jack	J1
16	Speaker header	J7
17	I/O expansion header	J9
18	User Switch1	SW1
19	User Switch2	SW2
20	Ethernet RJ45	J14
21	Audio Volume up switch	SW3
22	Audio Volume down switch	SW4
23	Board On/Off switch	SW5
24	DC 5V jack	J20
25	Back-light Conn	J22
26	MIPI DSI expansion Conn	J25
27	Touch panel Conn	J26
28	uSD card Conn	J27

Chapter 5

WISE BOARD SOFTWARE SETUP

5 Software Setup

5.1 SD card setup

- Mount the SD card on Host PC.
- Check the mounted location.
- Unmount the SD card.

```
$ sudo umount /dev/<hard_disk_partition>
```

For example, if the card is mounted on sdc1,

```
$ sudo umount /dev/sdc1
```

- Run the following commands to format the SD card.

```
$ sudo fdisk /dev/<hard_disk_partition>
```

For example,

```
$ sudo fdisk /dev/sdc
```

- Change sectors into cylinders by hitting, '**u**'
- Create a new empty DOS partition table by hitting '**o**'
- Enter into expert mode by hitting '**x**'
- By hitting '**h**', set the number of heads. Enter the value as '**255**'
- By hitting '**s**', set the number of sectors. Enter the value as '**63**'
- By hitting '**c**' set the number of cylinders.
- Set the cylinder size by below calculation.
 - $\text{cylinder} = \text{<total size>} / \text{<heads>} / \text{<sectors>} / \text{<blocksize>}$
 - For 8GB cards, it should be **966**
 - For 2GB cards, it should be **239**
- Leave expert mode by hitting '**r**'
- Create new partition by hitting '**n**'
- Hit '**p**' for primary partition and hit '**1**' for partition number.

- Set first cylinder value as '3' and last cylinder value as '+100M'
- Save and exit by hitting 'w'

Log:

```

~$ sudo fdisk /dev/sdc
Command (m for help): u
Changing display/entry units to cylinders (DEPRECATED!)
Command (m for help): o
Building a new DOS disklabel with disk identifier 0x4bd5af12.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.
Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)
WARNING: cylinders as display units are deprecated. Use command 'u' to
        change units to sectors.
Command (m for help): x
Expert command (m for help): h
Number of heads (1-256, default 157): 255
Expert command (m for help): s
Number of sectors (1-63, default 58): 63
Expert command (m for help): c
Number of cylinders (1-1048576, default 1721): 966
Expert command (m for help): r
Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
Select (default p): p
Partition number (1-4, default 1): 1
First cylinder (1-966, default 1): 3
Last cylinder, +cylinders or +size{K,M,G} (3-966, default 966): +100M
Command (m for help): w

```

The partition table has been altered!

Calling ioctl() to re-read partition table.

Syncing disks.

5.2 Flash binaries on SD card

- Untar the file filename.tar.gz to <dest_folder_name> in your local system.

```
$ tar -xzf MS_FS_MX6_VISE_SW_RELEASE_1_0.tar.gz -C /<dest_folder_name>
```

- Run the following commands to flash boot loader, kernel and device tree into SD card.
- Go to <dest_folder_name>/MS_FS_MX6_VISE_SW_RELEASE_1_0/binary folder

```
$ cd <dest_folder_name>
$ sudo dd if=u-boot.imx of=/dev/sdc bs=512 seek=2
```

- u-boot will be written at 1K ($2 \times 512 = 1024$) offset.

```
$ sudo dd if=ulmage of=/dev/sdc bs=512 seek=2048 conv=fsync
```

- ulmage will be written at 1M ($2048 \times 512 = 1\text{M}$) offset.

```
$ sudo dd if=imx6q-vise.dtb of=/dev/sdc bs=512 seek=20480 conv=fsync
```

- device tree binary will be written at 10M ($20480 \times 512 = 10\text{M}$) offset.

5.3 Setup SD card to copy filesystem

- Connect SD card on Host PC.
- Check the mounted location.
- Unmount the SD card.

```
$ sudo umount /dev/<hard_disk_partition>
```

For example, If the card is mounted on sdc1,

```
$ sudo umount /dev/sdc1
```

- Run the following commands to format the SD card.

```
$ sudo fdisk /dev/<hard_disk_partition>
```

For example,

```
$ sudo fdisk /dev/sdc
```

- Change display/entry units to cylinders by hitting 'u'

- Change display/entry units to sectors by hitting '**u**' again.
- Delete the residing partitions by hitting '**d**' and the partition number.
- Hit '**n**' to create new partition.
- Set it as primary partition by hitting '**p**' and set the partition number as '**1**'
- Enter '**+20M**' for the first sector and **<space> key** to select the full size of card.
- Save and exit by hitting '**w**'
- Format the partition as ext3 by executing the below command:

```
$ sudo mkfs.ext3 -L "rootfs" /dev/<hard_disk_partition_number>
```

For example,

```
$ sudo mkfs.ext3 -L "rootfs" /dev/sdc1
```

Log:

```
$ sudo fdisk /dev/sdc
```

```
[sudo] password for mistral:
```

```
Command (m for help): u
```

```
Changing display/entry units to cylinders (DEPRECATED!)
```

```
Command (m for help): u
```

```
Changing display/entry units to sectors
```

```
Command (m for help): d
```

```
Selected partition 1
```

```
Command (m for help): n
```

```
Partition type:
```

p primary (0 primary, 0 extended, 4 free)

e extended

Select (default p): **p**

Partition number (1-4, default 1): **1**

First sector (2048-15677439, default 2048): **+20M**

Last sector, +sectors or +size{K,M,G} (40960-15677439, default 15677439):

Using default value 15677439

Command (m for help): **w**

The partition table has been altered!

Calling ioctl() to re-read partition table.

Syncing disks.

\$ **sudo mkfs.ext3 -L "rootfs" /dev/sdc1**

mkfs 1.42.9 (4-Feb-2014)

Filesystem label=rootfs

OS type: Linux

Block size=4096 (log=2)

Fragment size=4096 (log=2)

Stride=0 blocks, Stripe width=0 blocks

488640 inodes, 1954560 blocks

97728 blocks (5.00%) reserved for the super user

First data block=0

Maximum filesystem blocks=2004877312

60 block groups

32768 blocks per group, 32768 fragments per group

8144 inodes per group

Superblock backups stored on blocks:

32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done

Writing inode tables: done

Creating journal (32768 blocks): done

Writing superblocks and filesystem accounting information: done

5.4 Copy the Linux file system into SD Card

- Mount the SD card on Host PC.
- Copy the contents of rootfs directory into SD card.

```
$ sudo tar -xjvf < core-image-minimal-imx6qvisetar.bz2 > -C /media/rootfs/
$ sync
$ umount /media/rootfs
```

Chapter 6

BOOTING WISEBOARD

6 Booting the Board

6.1 SD – sysboot pin settings

Table 1: SD – sysboot pin settings

Pin No.,	1	2	3	4	5	6
State	OFF	ON	OFF	ON	ON	OFF

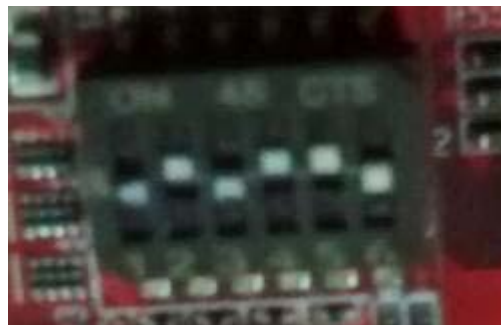


Figure 4: SD - sysboot pin setting

6.2 SD Boot

- Flash the binaries into SD card by referring section 5.1 to 5.4
- Insert the SD card on J27 port of WISE Board / or Carrier Module of the WISE Board.
- Set boot pins for SD boot (mentioned in section 6.1)
- Power ON the board (SW5).
- Board boots the bootloader, kernel and file system from SD card.
- Login to the filesystem by login name as '**root**'(needs no password).

Log:

U-Boot 2014.10+ (Mar 17 2015 - 12:00:09)

CPU: Freescale i.MX6Q rev1.5 at 792 MHz

```

Reset cause: POR

Board: MX6-WISE

I2C:  ready

DRAM:  1 GiB

MMC:  FSL_SDHC: 0, FSL_SDHC: 1

*** Warning - bad CRC, using default environment

auto-detected panel HDMI

Display: HDMI (1024x768)

In:  serial

Out:  serial

Err:  serial

PMIC:  PFUZE100 ID=0x10

Net:  FEC [PRIME]

Error: FEC address not set.

Hit any key to stop autoboot:  0

switch to partitions #0, OK

mmc0 is current device

** Unrecognized filesystem type **

MMC read: dev # 0, block # 2048, count 12288 ... 12288 blocks read: OK

MMC read: dev # 0, block # 20480, count 2048 ... 2048 blocks read: OK

Booting from mmc ...

## Booting kernel from Legacy Image at 12000000 ...

   Image Name:   Linux-3.18.7-fslc+gce1cd89

   Image Type:   ARM Linux Kernel Image (uncompressed)

   Data Size:    5534992 Bytes = 5.3 MiB

   Load Address: 10008000

   Entry Point:  10008000

```

Verifying Checksum ... OK

Flattened Device Tree blob at 18000000

Booting using the fdt blob at 0x18000000

Loading Kernel Image ... OK

Using Device Tree in place at 18000000, end 1800b752

Starting kernel ...

```
[ 0.000000] Booting Linux on physical CPU 0x0
[ 0.000000] Linux version 3.18.7-fslc+gce1cd89 (vijai@ubuntu) (gcc version 4.5
[ 0.000000] CPU: ARMv7 Processor [412fc09a] revision 10 (ARMv7), cr=10c5387d
[ 0.000000] CPU: PIPT / VIPT nonaliasing data cache, VIPT aliasing instruction
[ 0.000000] Machine model: Freescale i.MX6 Quad SABRE Smart Device Board
[ 0.000000] cma: Reserved 16 MiB at 0x9f000000
[ 0.000000] Memory policy: Data cache writealloc
[ 0.000000] On node 0 totalpages: 262144
[ 0.000000] free_area_init_node: node 0, pgdat 809d9740, node_mem_map 9edf800
[ 0.000000] Normal zone: 1024 pages used for memmap
[ 0.000000] Normal zone: 0 pages reserved
[ 0.000000] Normal zone: 131072 pages, LIFO batch: 31
[ 0.000000] HighMem zone: 3584 pages used for memmap
[ 0.000000] HighMem zone: 131072 pages, LIFO batch: 31
[ 0.000000] PERCPU: Embedded 10 pages/cpu @9ed97000 s8960 r8192 d23808
u40960
[ 0.000000] pcpu-alloc: s8960 r8192 d23808 u40960 alloc=10*4096
[ 0.000000] pcpu-alloc: [0] 0 [0] 1 [0] 2 [0] 3
[ 0.000000] Built 1 zonelists in Zone order, mobility grouping on. Total pa0
[ 0.000000] Kernel command line: console=ttyMXC0,115200 root=/dev/mmcblk0p1 8
[ 0.000000] PID hash table entries: 2048 (order: 1, 8192 bytes)
[ 0.000000] Dentry cache hash table entries: 65536 (order: 6, 262144 bytes)
[ 0.000000] Inode-cache hash table entries: 32768 (order: 5, 131072 bytes)
```

```
[ 0.000000] Memory: 1004736K/1048576K available (6919K kernel code, 409K rwd)
[ 0.000000] Virtual kernel memory layout:
[ 0.000000]   vector : 0xffff0000 - 0xffff1000  ( 4 kB)
[ 0.000000]   fixmap : 0xffc00000 - 0xffe00000  (2048 kB)
[ 0.000000]   vmalloc : 0xa0800000 - 0xff000000  (1512 MB)
[ 0.000000]   lowmem : 0x80000000 - 0xa0000000  ( 512 MB)
[ 0.000000]   pkmap : 0x7fe00000 - 0x80000000  ( 2 MB)
[ 0.000000]   modules : 0x7f000000 - 0x7fe00000  ( 14 MB)
[ 0.000000]   .text : 0x80008000 - 0x8091aff4  (9292 kB)
[ 0.000000]   .init : 0x8091b000 - 0x80974000  ( 356 kB)
[ 0.000000]   .data : 0x80974000 - 0x809da7a0  ( 410 kB)
[ 0.000000]   .bss : 0x809da7a0 - 0x81201fd4  (8351 kB)
[ 0.000000] SLUB: HWalign=64, Order=0-3, MinObjects=0, CPUs=4, Nodes=1
[ 0.000000] Hierarchical RCU implementation.
[ 0.000000] NR_IRQS:16 nr_irqs:16 16
[ 0.000000] L2C-310 erratum 769419 enabled
[ 0.000000] L2C-310 enabling early BRESP for Cortex-A9
[ 0.000000] L2C-310 full line of zeros enabled for Cortex-A9
[ 0.000000] L2C-310 ID prefetch enabled, offset 1 lines
[ 0.000000] L2C-310 dynamic clock gating enabled, standby mode enabled
[ 0.000000] L2C-310 cache controller enabled, 16 ways, 1024 kB
[ 0.000000] L2C-310: CACHE_ID 0x410000c7, AUX_CTRL 0x76070001
[ 0.000000] Switching to timer-based delay loop, resolution 333ns
[ 0.000007] sched_clock: 32 bits at 3000kHz, resolution 333ns, wraps every 1s
[ 0.001023] Console: colour dummy device 80x30
[ 0.001052] Lock dependency validator: Copyright (c) 2006 Red Hat, Inc., Ingr
[ 0.001062] ... MAX_LOCKDEP_SUBCLASSES:  8
[ 0.001070] ... MAX_LOCK_DEPTH:          48
[ 0.001079] ... MAX_LOCKDEP_KEYS:           8191
[ 0.001086] ... CLASSHASH_SIZE:             4096
[ 0.001094] ... MAX_LOCKDEP_ENTRIES:        32768
```

```
[ 0.001102] ... MAX_LOCKDEP_CHAINS:    65536
[ 0.001109] ... CHAINHASH_SIZE:        32768
[ 0.001117] memory used by lock dependency info: 5167 kB
[ 0.001126] per task-struct memory footprint: 1152 bytes
[ 0.001159] Calibrating delay loop (skipped), value calculated using timer f)
[ 0.001177] pid_max: default: 32768 minimum: 301
[ 0.001551] Mount-cache hash table entries: 1024 (order: 0, 4096 bytes)
[ 0.001567] Mountpoint-cache hash table entries: 1024 (order: 0, 4096 bytes)
[ 0.003125] CPU: Testing write buffer coherency: ok
[ 0.003873] CPU0: thread -1, cpu 0, socket 0, mpidr 80000000
[ 0.003977] Setting up static identity map for 0x106c7838 - 0x106c78a8
[ 0.008136] CPU1: Booted secondary processor
[ 0.008172] CPU1: thread -1, cpu 1, socket 0, mpidr 80000001
[ 0.009843] CPU2: Booted secondary processor
[ 0.009876] CPU2: thread -1, cpu 2, socket 0, mpidr 80000002
[ 0.011288] CPU3: Booted secondary processor
[ 0.011320] CPU3: thread -1, cpu 3, socket 0, mpidr 80000003
[ 0.011495] Brought up 4 CPUs
[ 0.011532] SMP: Total of 4 processors activated (24.00 BogoMIPS).
[ 0.011541] CPU: All CPU(s) started in SVC mode.
[ 0.013349] devtmpfs: initialized
[ 0.022424] VFP support v0.3: implementor 41 architecture 3 part 30 variant 4
[ 0.024755] pinctrl core: initialized pinctrl subsystem
[ 0.026140] regulator-dummy: no parameters
[ 0.052411] NET: Registered protocol family 16
[ 0.055567] DMA: preallocated 256 KiB pool for atomic coherent allocations
[ 0.057578] CPU identified as i.MX6Q, silicon rev 1.5
[ 0.077596] vdd1p1: 800 <--> 1375 mV at 1100 mV
[ 0.078586] vdd3p0: 2800 <--> 3150 mV at 3000 mV
[ 0.079522] vdd2p5: 2000 <--> 2750 mV at 2400 mV
[ 0.080590] vddarm: 725 <--> 1450 mV at 1150 mV
```

```
[ 0.081589] vddpu: 725 <--> 1450 mV at 1150 mV
[ 0.082590] vddsoc: 725 <--> 1450 mV at 1175 mV
[ 0.100178] hw-breakpoint: found 5 (+1 reserved) breakpoint and 1 watchpoint.
[ 0.100193] hw-breakpoint: maximum watchpoint size is 4 bytes.
[ 0.102057] imx6q-pinctrl 20e0000.iomuxc: Invalid fsl,pins property in node p
[ 0.102897] imx6q-pinctrl 20e0000.iomuxc: initialized IMX pinctrl driver
[ 0.157016] mxs-dma 110000.dma-apbh: initialized
[ 0.158553] usb_otg_vbus: 5000 mV
[ 0.159224] usb_h1_vbus: 5000 mV
[ 0.159935] wm8962-supply: no parameters
[ 0.160603] MPCIE_3V3: 3300 mV
[ 0.162617] vgaarb: loaded
[ 0.163556] SCSI subsystem initialized
[ 0.163974] libata version 3.00 loaded.
[ 0.164632] usbcore: registered new interface driver usbfs
[ 0.164786] usbcore: registered new interface driver hub
[ 0.165002] usbcore: registered new device driver usb
[ 0.169256] i2c i2c-0: IMX I2C adapter registered
[ 0.181408] i2c i2c-1: IMX I2C adapter registered
[ 0.183969] i2c i2c-2: IMX I2C adapter registered
[ 0.184157] Linux video capture interface: v2.00
[ 0.184396] pps_core: LinuxPPS API ver. 1 registered
[ 0.184408] pps_core: Software ver. 5.3.6 - Copyright 2005-2007 Rodolfo Giom>
[ 0.184471] PTP clock support registered
[ 0.185388] Advanced Linux Sound Architecture Driver Initialized.
[ 0.189202] cfg80211: Calling CRDA to update world regulatory domain
[ 0.190476] Switched to clocksource mxc_timer1
[ 0.217168] NET: Registered protocol family 2
[ 0.218619] TCP established hash table entries: 4096 (order: 2, 16384 bytes)
[ 0.218794] TCP bind hash table entries: 4096 (order: 5, 147456 bytes)
[ 0.220054] TCP: Hash tables configured (established 4096 bind 4096)
```

```
[ 0.220225] TCP: reno registered
[ 0.220255] UDP hash table entries: 256 (order: 2, 20480 bytes)
[ 0.220503] UDP-Lite hash table entries: 256 (order: 2, 20480 bytes)
[ 0.221521] NET: Registered protocol family 1
[ 0.222466] RPC: Registered named UNIX socket transport module.
[ 0.222482] RPC: Registered udp transport module.
[ 0.222493] RPC: Registered tcp transport module.
[ 0.222505] RPC: Registered tcp NFSv4.1 backchannel transport module.
[ 0.222535] PCI: CLS 0 bytes, default 64
[ 0.223588] hw perfevents: enabled with armv7_cortex_a9 PMU driver, 7 countee
[ 0.226897] futex hash table entries: 1024 (order: 4, 65536 bytes)
[ 0.244137] VFS: Disk quotas dquot_6.5.2
[ 0.244585] Dquot-cache hash table entries: 1024 (order 0, 4096 bytes)
[ 0.251365] NFS: Registering the id_resolver key type
[ 0.251567] Key type id_resolver registered
[ 0.251582] Key type id_legacy registered
[ 0.251752] jffs2: version 2.2. (NAND) ♦© 2001-2006 Red Hat, Inc.
[ 0.253547] fuse init (API version 7.23)
[ 0.254351] msgmni has been set to 970
[ 0.256433] bounce: pool size: 64 pages
[ 0.256506] io scheduler noop registered
[ 0.256529] io scheduler deadline registered
[ 0.256625] io scheduler cfq registered (default)
[ 0.257305] imx-weim 21b8000.weim: Driver registered.
[ 0.579243] imx6q-pcie 1ffc000.pcie: phy link never came up
[ 0.579807] imx6q-pcie 1ffc000.pcie: PCI host bridge to bus 0000:00
[ 0.579829] pci_bus 0000:00: root bus resource [io 0x1000-0xffff]
[ 0.579845] pci_bus 0000:00: root bus resource [mem 0x01000000-0x01efffff]
[ 0.579863] pci_bus 0000:00: root bus resource [bus 00-ff]
[ 0.579958] pci 0000:00:00.0: [16c3:abcd] type 01 class 0x060400
[ 0.580003] pci 0000:00:00.0: reg 0x10: [mem 0x00000000-0x000fffff]
```



```
[ 0.580041] pci 0000:00:00.0: reg 0x38: [mem 0x00000000-0x0000ffff pref]
[ 0.580225] pci 0000:00:00.0: supports D1
[ 0.580242] pci 0000:00:00.0: PME# supported from D0 D1 D3hot D3cold
[ 0.581093] PCI: bus0: Fast back to back transfers disabled
[ 0.581460] PCI: bus1: Fast back to back transfers enabled
[ 0.581483] pci_bus 0000:01: busn_res: [bus 01-ff] end is updated to 01
[ 0.581599] pci 0000:00:00.0: BAR 0: assigned [mem 0x01000000-0x010fffff]
[ 0.581626] pci 0000:00:00.0: BAR 6: assigned [mem 0x01100000-0x0110ffff pre]
[ 0.581644] pci 0000:00:00.0: PCI bridge to [bus 01]
[ 0.582219] pcieport 0000:00:00.0: Signaling PME through PCIe PME interrupt
[ 0.582245] pcie_pme 0000:00:00.0: pcie01: service driver pcie_pme loaded
[ 0.584739] backlight supply power not found, using dummy regulator
[ 0.588419] imx-sdma 20ec000.sdma: Direct firmware load for imx/sdma/sdma-im2
[ 0.588445] imx-sdma 20ec000.sdma: firmware not found
[ 0.595786] imx-sdma 20ec000.sdma: initialized
[ 0.597858] pfuze100-regulator 1-0008: Full layer: 2, Metal layer: 1
[ 0.598500] pfuze100-regulator 1-0008: FAB: 0, FIN: 0
[ 0.598517] pfuze100-regulator 1-0008: pfuze100 found.
[ 0.600547] SW1AB: 300 <--> 1875 mV at 1375 mV
[ 0.602323] SW1C: 300 <--> 1875 mV at 1375 mV
[ 0.603470] SW2: 800 <--> 3300 mV at 3150 mV
[ 0.604597] SW3A: 400 <--> 1975 mV at 1200 mV
[ 0.605736] SW3B: 400 <--> 1975 mV at 1200 mV
[ 0.606940] SW4: 800 <--> 1975 mV at 1800 mV
[ 0.608071] SWBST: 5000 <--> 5150 mV at 5000 mV
[ 0.609666] VSNVS: 1000 <--> 3000 mV at 3000 mV
[ 0.610856] VREFDDR: 750 mV
[ 0.612016] VGEN1: 800 <--> 1550 mV at 1200 mV
[ 0.613187] VGEN2: 800 <--> 1550 mV at 800 mV
[ 0.614385] VGEN3: 1800 <--> 3300 mV at 2800 mV
[ 0.615576] VGEN4: 1800 <--> 3300 mV at 1800 mV
```

```
[ 0.616838] VGEN5: 1800 <--> 3300 mV at 3000 mV
[ 0.618515] VGEN6: 1800 <--> 3300 mV at 1800 mV
[ 0.619945] Serial: IMX driver
[ 0.620733] 2020000.serial: ttyMXC0 at MMIO 0x2020000 (irq = 58, base_baud = X
[ 1.616498] console [ttyMXC0] enabled
[ 1.622092] serial: Freescale lpuart driver
[ 1.627116] [drm] Initialized drm 1.1.0 20060810
[ 1.634749] imx-ipuv3 2400000.ipu: IPUv3H probed
[ 1.641224] imx-ipuv3 2800000.ipu: IPUv3H probed
[ 1.664266] brd: module loaded
[ 1.677477] loop: module loaded
[ 1.682279] ahci-imx 2200000.sata: fsl,transmit-level-mV not specified, usin4
[ 1.690225] ahci-imx 2200000.sata: fsl,transmit-boost-mdB not specified, usi0
[ 1.698279] ahci-imx 2200000.sata: fsl,transmit-atten-16ths not specified, u0
[ 1.706498] ahci-imx 2200000.sata: fsl,receive-eq-mdB not specified, using 00
[ 1.717389] ahci-imx 2200000.sata: SSS flag set, parallel bus scan disabled
[ 1.724432] ahci-imx 2200000.sata: AHCI 0001.0300 32 slots 1 ports 3 Gbps 0xe
[ 1.733264] ahci-imx 2200000.sata: flags: ncq sntf stag pm led clo only pmp
[ 1.745402] scsi host0: ahci_platform
[ 1.750206] ata1: SATA max UDMA/133 mmio [mem 0x02200000-0x02203fff] port
0x1
[ 1.762744] CAN device driver interface
[ 1.768262] 2188000.ethernet supply phy not found, using dummy regulator
[ 1.791794] pps pps0: new PPS source ptp0
[ 1.796597] fec 2188000.ethernet (unnamed net_device) (uninitialized): Inval0
[ 1.806590] fec 2188000.ethernet (unnamed net_device) (uninitialized): Using8
[ 1.824179] libphy: fec_enet_mii_bus: probed
[ 1.830056] fec 2188000.ethernet eth0: registered PHC device 0
[ 1.837141] ehci_hcd: USB 2.0 'Enhanced' Host Controller (EHCI) Driver
[ 1.843718] ehci-pci: EHCI PCI platform driver
[ 1.848324] ehci-mxc: Freescale On-Chip EHCI Host driver
```

```
[ 1.854048] usbcore: registered new interface driver usb-storage
[ 1.873238] ci_hdrc ci_hdrc.1: doesn't support gadget
[ 1.878345] ci_hdrc ci_hdrc.1: EHCI Host Controller
[ 1.883426] ci_hdrc ci_hdrc.1: new USB bus registered, assigned bus number 1
[ 1.910527] ci_hdrc ci_hdrc.1: USB 2.0 started, EHCI 1.00
[ 1.919239] hub 1-0:1.0: USB hub found
[ 1.923288] hub 1-0:1.0: 1 port detected
[ 1.930296] mousedev: PS/2 mouse device common for all mice
[ 1.937470] egalax_ts 2-0004: Failed to read firmware version
[ 1.943303] egalax_ts: probe of 2-0004 failed with error -5
[ 1.950288] input: st1232-touchscreen as /devices/soc0/soc/2100000.aips-bus/1
[ 1.964145] snvs_rtc 20cc034.snvs-rtc-lp: rtc core: registered 20cc034.snvs-0
[ 1.972685] i2c /dev entries driver
[ 1.978729] IR NEC protocol handler initialized
[ 1.983358] IR RC5(x/sz) protocol handler initialized
[ 1.988436] IR RC6 protocol handler initialized
[ 1.993008] IR JVC protocol handler initialized
[ 1.997560] IR Sony protocol handler initialized
[ 2.002246] IR SANYO protocol handler initialized
[ 2.006972] IR Sharp protocol handler initialized
[ 2.011719] IR MCE Keyboard/mouse protocol handler initialized
[ 2.017574] IR XMP protocol handler initialized
[ 2.026824] imx2-wdt 20bc000.wdog: timeout 60 sec (nowayout=0)
[ 2.033468] sdhci: Secure Digital Host Controller Interface driver
[ 2.039663] sdhci: Copyright(c) Pierre Ossman
[ 2.044113] sdhci-pltfm: SDHCI platform and OF driver helper
[ 2.050856] sdhci-esdhc-imx 2194000.usdhc: could not get ultra high speed ste
[ 2.060228] sdhci-esdhc-imx 2194000.usdhc: No vmmc regulator found
[ 2.066467] sdhci-esdhc-imx 2194000.usdhc: No vqmmc regulator found
[ 2.090522] ata1: SATA link down (SStatus 0 SControl 300)
[ 2.095992] ahci-imx 2200000.sata: no device found, disabling link.
```

```
[ 2.102302] ahci-imx 2200000.sata: pass ahci_imx..hotplug=1 to enable hotplug
[ 2.110807] mmc0: SDHCI controller on 2194000.usdhc [2194000.usdhc] using ADA
[ 2.123414] sdhci-esdhc-imx 2198000.usdhc: No vmmc regulator found
[ 2.129636] sdhci-esdhc-imx 2198000.usdhc: No vqmmc regulator found
[ 2.180623] mmc1: SDHCI controller on 2198000.usdhc [2198000.usdhc] using ADA
[ 2.192701] usbcore: registered new interface driver usbhid
[ 2.198325] usbhid: USB HID core driver
[ 2.206513] mmc0: host does not support reading read-only switch, assuming we
[ 2.216094] [drm] Supports vblank timestamp caching Rev 2 (21.10.2013).
[ 2.222776] [drm] No driver support for vblank timestamp query.
[ 2.229316] imx-drm display-subsystem: bound imx-ipuv3-crtc.0 (ops ipu_crtc_)
[ 2.229884] mmc0: new high speed SDHC card at address 59b4
[ 2.240767] mmcblk0: mmc0:59b4 USD 7.47 GiB
[ 2.246942] mmcblk0: p1
[ 2.247032] imx-drm display-subsystem: bound imx-ipuv3-crtc.1 (ops ipu_crtc_)
[ 2.247282] imx-drm display-subsystem: bound imx-ipuv3-crtc.4 (ops ipu_crtc_)
[ 2.247520] imx-drm display-subsystem: bound imx-ipuv3-crtc.5 (ops ipu_crtc_)
[ 2.272327] imx-hdmi 120000.hdmi: Detected HDMI controller 0x13:0xa:0xa0:0xc1
[ 2.279805] imx-drm display-subsystem: bound 120000.hdmi (ops hdmi_ops)
[ 2.291395] imx-drm display-subsystem: bound 2000000.aips-bus:ldb@020e0008 ()
[ 2.391099] Console: switching to colour frame buffer device 128x48
[ 2.415255] imx-drm display-subsystem: fb0: frame buffer device
[ 2.421300] imx-drm display-subsystem: registered panic notifier
[ 2.450521] [drm] Initialized imx-drm 1.0.0 20120507 on minor 0
[ 2.615048] i2c 0-004b: Driver max44009 requests probe deferral
[ 2.630595] wm8962 0-001a: Failed to read ID register
[ 2.637433] wm8962: probe of 0-001a failed with error -5
[ 2.647397] imx-wm8962 sound: failed to find codec platform device
[ 2.653677] imx-wm8962: probe of sound failed with error -22
[ 2.660574] TCP: cubic registered
[ 2.665381] NET: Registered protocol family 10
```

```
[ 2.672921] sit: IPv6 over IPv4 tunneling driver
[ 2.679430] NET: Registered protocol family 17
[ 2.683978] can: controller area network core (rev 20120528 abi 9)
[ 2.690343] NET: Registered protocol family 29
[ 2.694853] can: raw protocol (rev 20120528)
[ 2.699239] can: broadcast manager protocol (rev 20120528 t)
[ 2.704979] can: netlink gateway (rev 20130117) max_hops=1
[ 2.711150] Key type dns_resolver registered
[ 2.718856] Registering SWP/SWPB emulation handler
[ 2.728095] i2c 0-004b: Driver max44009 requests probe deferral
[ 2.740920] input: gpio-keys as /devices/soc0/gpio-keys/input/input2
[ 2.750641] snvs_rtc 20cc034.snvs-rtc-lp: setting system clock to 1970-01-01)
[ 2.759306] i2c 0-004b: Driver max44009 requests probe deferral
[ 2.808293] VGEN1: disabling
[ 2.811944] SWBST: disabling
[ 2.815376] SW4: disabling
[ 2.818108] wm8962-supply: disabling
[ 2.821747] usb_otg_vbus: disabling
[ 2.825784] ALSA device list:
[ 2.828766]  No soundcards found.
[ 3.021100] kjournald starting. Commit interval 5 seconds
[ 3.029055] EXT3-fs (mmcblk0p1): using internal journal
[ 3.042962] EXT3-fs (mmcblk0p1): recovery complete
[ 3.047785] EXT3-fs (mmcblk0p1): mounted filesystem with ordered data mode
[ 3.054787] VFS: Mounted root (ext3 filesystem) on device 179:1.
[ 3.064552] devtmpfs: mounted
[ 3.068076] Freeing unused kernel memory: 356K (8091b000 - 80974000)
INIT: version 2.88 booting
Starting udev
[ 3.873939] udevd[106]: starting version 182
bootlogd: cannot allocate pseudo tty: No such file or directory
```

```
[ 5.022628] random: dd urandom read with 59 bits of entropy available
Thu Apr 9 07:18:59 UTC 2015
INIT: Entering runlevel: 5
Configuring network interfaces... [ 6.073373] fec 2188000.ethernet eth0: Freescale
FEC PHY driver [Ath)
[ 6.086243] IPv6: ADDRCONF(NETDEV_UP): eth0: link is not ready
udhcpd (v1.22.1) started
Sending discover...
Sending discover...
Sending discover...
No lease, forking to background
done.
Starting syslogd/klogd: done

Poky (Yocto Project Reference Distro) 1.7.1 imx6qvis /dev/ttyMXC0

imx6qvis login: root

root@imx6qvis: ~#
```

6.3 eMMC boot

- Copy the u-boot.imx, uImage and imx6q-vis.dtb binaries into boot directory of the SD card.
- Copy the tar file of minimal file system into the same directory.
- Boot the board via SD card.
- Login to the filesystem by login name '**root**' (needs no password).
- Format the eMMC and flash the images by following sections.

6.3.1 Formatting eMMC

- Run the following commands to format the SD card.

```
$ fdisk.util-linux /dev/mmcblk1
```

- Change sectors into cylinders by hitting '**u**'
- Create a new empty DOS partition table by hitting '**o**'
- Enter into expert mode by hitting '**x**'
- By hitting '**h**', set the number of heads. Enter the value as '**255**'
- By hitting '**s**', set the number of sectors. Enter the value as '**63**'
- By hitting '**c**' set the number of cylinders.
- Set the cylinder size as '**470**'
- Leave expert mode by hitting '**r**'
- Create new partition by hitting '**n**'
- Hit '**p**' for primary partition and hit '**1**' for partition number.
- Set first cylinder value as '**3**' and last cylinder value as '**6**'
- Save and exit by hitting '**w**'

Log:

```
$ fdisk.util-linux /dev/mmcbk1
```

Welcome to fdisk (util-linux 2.25.2).

Changes will remain in memory only, until you decide to write them.

Be careful before using the write command.

Command (m for help):

```
u
```

Changing display/entry units to cylinders (DEPRECATED!).

Command (m for help): **o**

Cylinders as display units are deprecated.

Created a new DOS disklabel with disk identifier 0xb20959ce.

Command (m for help): **p**

Disk /dev/mmcblk1: 3.6 GiB, 3867148288 bytes, 7553024 sectors

Geometry: 4 heads, 16 sectors /track, 118016 cylinders

Units: cylinders of 64 * 512 = 32768 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disklabel type: dos

Disk identifier: 0xb20959ce

Command (m for help): **x**

Expert command (m for help): **h**

Number of heads (1-256, default 4): **255**

Expert command (m for help): **s**

Number of sectors (1-63, default 16): **63**

Expert command (m for help): **c**

Number of cylinders (1-1048576, default 470): **470**

Expert command (m for help): **r**

Command (m for help): **n**

Partition type

p primary (0 primary, 0 extended, 4 free)

e extended (container for logical partitions)

Select (default p): **p**

Partition number (1-4, default 1): **1**

First cylinder (1-470, default 1): **3**

Last cylinder, +cylinders or +size{K,M,G,T,P} (3-470, default 470): **6**

Created a new partition 1 of type 'Linux' and of size 31.4 MiB.

Command (m for help): **w**

The partition table has been altered.

Calling ioctl() to re-read partition table.

[228.729808] mmcblk1: p1

Syncing disks.

[228.749648] mmcblk1: p1

6.3.2 Flashing images into eMMC

Go to the boot directory of SD card and copy the images onto eMMC by below commands.

```
$ cd /boot/
$ dd if=u-boot.imx of=/dev/mmcblk1 bs=512 seek=2 && sync
$ dd if=ul image of=/dev/mmcblk1 bs=512 seek=2048 && sync
$ dd if=imx6q-vice.dtb of=/dev/mmcblk1 bs=512 seek=20480 && sync
```

6.3.3 Setup eMMC to copy filesystem

- Run the following commands to format the SD card.

```
$ fdisk.util-linux /dev/mmcblk1
```

- Change display/entry units to cylinders by hitting '**u**'
- Change display/entry units to sectors by hitting '**u**' again.
- Delete the residing partitions by hitting '**d**' and the partition number.
- Hit '**n**' to create new partition.
- Set it as primary partition by hitting '**p**' and set the partition number as '**1**'
- Enter '**64308**' for the first sector and **<space> key** to select the full size of card.
- Save and exit by hitting '**w**'
- Format the partition as ext3 by executing the below command:

```
$ mkfs.ext3 -L "rootfs" /dev/mmcblk1p1
```

Log:

```
[root@alarm home]# fdisk.util-linux /dev/mmcblk1
```

Welcome to fdisk (util-linux 2.25.2).

Changes will remain in memory only, until you decide to write them.

Be careful before using the write command.

Command (m for help): **u**

Changing display/entry units to cylinders (DEPRECATED!).

Command (m for help): **u**

Changing display/entry units to sectors.

Command (m for help): **d**

Selected partition 1

Partition 1 has been deleted.

Command (m for help): **n**

Partition type

p primary (0 primary, 0 extended, 4 free)

e extended (container for logical partitions)

Select (default p): **p**

Partition number (1-4, default 1): **1**

First sector (2048-7553023, default 2048): **64308**

Last sector, +sectors or +size{K,M,G,T,P} (64308-7553023, default 7553023):

Created a new partition 1 of type 'Linux' and of size 3.6 GiB.

Command (m for help): **w**

The partition table has been altered.

Calling ioctl() to re-read partition table.

[344.440333] mmcblk1: p1

Syncing disks.

\$ **mkfs.ext3 -L "rootfs" /dev/mmcblk1p1**

mke2fs 1.42.12 (29-Aug-2014)

/dev/mmcblk1p1 contains a ext3 file system labelled 'rootfs'

last mounted on /mnt on Mon Feb 16 14:36:55 2015

Proceed anyway? (y,n) **y**

Discarding device blocks: done

Creating filesystem with 936089 4k blocks and 234320 inodes

Filesystem UUID: 953ffcc2-826e-43c3-97cd-91f4667693b5

Superblock backups stored on blocks:

32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done

Writing inode tables: done

Creating journal (16384 blocks): done

Writing superblocks and filesystem accounting information: done

6.3.4 Copy filesystem into eMMC

- Mount the eMMC partition.

```
$ mount /dev/mmcblk1p1 /mnt
```

- Untar the file system into eMMC

```
$ tar -xjvf core-image-minimal-imx6qvisetar.bz2 -C /mnt
```

```
$ sync
```

- Unmount the eMMC partition

```
$ umount /mnt
```

6.3.5 eMMC – sysboot pin settings

Table 2: eMMC – sysboot pin settings

Pin No.,	1	2	3	4	5	6
State	ON	OFF	ON	OFF	ON	OFF



Figure 5: eMMC - sysboot pin setting

6.3.6 Booting from eMMC

- Power OFF the board.
- Disconnect the SD card from Host.
- Set boot pins for eMMC boot (mentioned in section 6.3.5)
- Power ON the board (SW5).
- Board boots the bootloader, kernel and file system from eMMC card.
- Login to the filesystem by login name as '**root**'(needs no password).

Log:

```
U-Boot 2014.10+ (Mar 17 2015 - 12:00:09)
```

```
CPU: Freescale i.MX6Q rev1.5 at 792 MHz
```

```
Reset cause: POR
```

```
Board: MX6-VISE
```

```

I2C:  ready

DRAM:  1 GiB

MMC:  FSL_SDHC: 0, FSL_SDHC: 1

Card did not respond to voltage select!

MMC init failed

Using default environment


auto-detected panel HDMI

Display: HDMI (1024x768)

In:  serial

Out:  serial

Err:  serial

PMIC:  PFUZE100 ID=0x10

Net:  FEC [PRIME]

Error: FEC address not set.


Hit any key to stop autoboot:  0

Card did not respond to voltage select!

switch to partitions #0, OK

mmc1(part 0) is current device


MMC read: dev # 1, block # 2048, count 12288 ... 12288 blocks read: OK


MMC read: dev # 1, block # 20480, count 2048 ... 2048 blocks read: OK

Booting from emmc ...

Card did not respond to voltage select!

## Booting kernel from Legacy Image at 12000000 ...

   Image Name:   Linux-3.18.7-fslc+gce1cd89

   Image Type:   ARM Linux Kernel Image (uncompressed)

   Data Size:    5534992 Bytes = 5.3 MiB

   Load Address: 10008000
    
```

Entry Point: 10008000

Verifying Checksum ... OK

Flattened Device Tree blob at 18000000

Booting using the fdt blob at 0x18000000

Loading Kernel Image ... OK

Using Device Tree in place at 18000000, end 1800b752

Starting kernel ...

[0.000000] Booting Linux on physical CPU 0x0

[0.000000] Linux version 3.18.7-fslc+gce1cd89 (vijai@ubuntu) (gcc version 4.9.1 (GCC)) #1 SMP Thu Apr 9 12:38:06 IST 2015

[0.000000] CPU: ARMv7 Processor [412fc09a] revision 10 (ARMv7), cr=10c5387d

[0.000000] CPU: PIPT / VIPT nonaliasing data cache, VIPT aliasing instruction cache

[0.000000] Machine model: Freescale i.MX6 Quad SABRE Smart Device Board

[0.000000] cma: Reserved 16 MiB at 0x9f000000

[0.000000] Memory policy: Data cache writealloc

[0.000000] PERCPU: Embedded 10 pages/cpu @9ed97000 s8960 r8192 d23808 u40960

[0.000000] Built 1 zonelists in Zone order, mobility grouping on. Total pages: 261120

[0.000000] Kernel command line: console=ttyMXC0,115200 root=/dev/mmcblk0p1 rootwait rw video=HDMI-A-1:1920x1024@60e

[0.000000] PID hash table entries: 2048 (order: 1, 8192 bytes)

[0.000000] Dentry cache hash table entries: 65536 (order: 6, 262144 bytes)

[0.000000] Inode-cache hash table entries: 32768 (order: 5, 131072 bytes)

[0.000000] Memory: 1004736K/1048576K available (6919K kernel code, 409K rwdma, 2372K rodata, 356K init, 8350K bss, 43840K reserved, 507904K highmem)

[0.000000] Virtual kernel memory layout:

[0.000000] vector : 0xffff0000 - 0xffff1000 (4 kB)

[0.000000] fixmap : 0xffc00000 - 0xffe00000 (2048 kB)

[0.000000] vmalloc : 0xa0800000 - 0xff000000 (1512 MB)

[0.000000] lowmem : 0x80000000 - 0xa0000000 (512 MB)


```
[ 0.000000] pkmap : 0x7fe00000 - 0x80000000 ( 2 MB)
[ 0.000000] modules : 0x7f000000 - 0x7fe00000 ( 14 MB)
[ 0.000000] .text : 0x80008000 - 0x8091aff4 (9292 kB)
[ 0.000000] .init : 0x8091b000 - 0x80974000 ( 356 kB)
[ 0.000000] .data : 0x80974000 - 0x809da7a0 ( 410 kB)
[ 0.000000] .bss : 0x809da7a0 - 0x81201fd4 (8351 kB)
[ 0.000000] SLUB: HWalign=64, Order=0-3, MinObjects=0, CPUs=4, Nodes=1
[ 0.000000] Hierarchical RCU implementation.
[ 0.000000] NR_IRQS:16 nr_irqs:16 16
[ 0.000000] L2C-310 erratum 769419 enabled
[ 0.000000] L2C-310 enabling early BRESP for Cortex-A9
[ 0.000000] L2C-310 full line of zeros enabled for Cortex-A9
[ 0.000000] L2C-310 ID prefetch enabled, offset 1 lines
[ 0.000000] L2C-310 dynamic clock gating enabled, standby mode enabled
[ 0.000000] L2C-310 cache controller enabled, 16 ways, 1024 kB
[ 0.000000] L2C-310: CACHE_ID 0x410000c7, AUX_CTRL 0x76070001
[ 0.000000] Switching to timer-based delay loop, resolution 333ns
[ 0.000007] sched_clock: 32 bits at 3000kHz, resolution 333ns, wraps every
1431655765682ns
[ 0.001021] Console: colour dummy device 80x30
[ 0.001051] Lock dependency validator: Copyright (c) 2006 Red Hat, Inc., Ingo Molnar
[ 0.001060] ... MAX_LOCKDEP_SUBCLASSES: 8
[ 0.001068] ... MAX_LOCK_DEPTH: 48
[ 0.001076] ... MAX_LOCKDEP_KEYS: 8191
[ 0.001084] ... CLASSHASH_SIZE: 4096
[ 0.001092] ... MAX_LOCKDEP_ENTRIES: 32768
[ 0.001099] ... MAX_LOCKDEP_CHAINS: 65536
[ 0.001107] ... CHAINHASH_SIZE: 32768
[ 0.001115] memory used by lock dependency info: 5167 kB
[ 0.001123] per task-struct memory footprint: 1152 bytes
[ 0.001157] Calibrating delay loop (skipped), value calculated using timer frequency..
6.00 BogoMIPS (lpj=30000)
```

```
[ 0.001175] pid_max: default: 32768 minimum: 301
[ 0.001544] Mount-cache hash table entries: 1024 (order: 0, 4096 bytes)
[ 0.001560] Mountpoint-cache hash table entries: 1024 (order: 0, 4096 bytes)
[ 0.003119] CPU: Testing write buffer coherency: ok
[ 0.003872] CPU0: thread -1, cpu 0, socket 0, mpidr 80000000
[ 0.003978] Setting up static identity map for 0x106c7838 - 0x106c78a8
[ 0.008133] CPU1: Booted secondary processor
[ 0.008169] CPU1: thread -1, cpu 1, socket 0, mpidr 80000001
[ 0.009814] CPU2: Booted secondary processor
[ 0.009848] CPU2: thread -1, cpu 2, socket 0, mpidr 80000002
[ 0.011246] CPU3: Booted secondary processor
[ 0.011277] CPU3: thread -1, cpu 3, socket 0, mpidr 80000003
[ 0.011454] Brought up 4 CPUs
[ 0.011490] SMP: Total of 4 processors activated (24.00 BogoMIPS).
[ 0.011501] CPU: All CPU(s) started in SVC mode.
[ 0.013258] devtmpfs: initialized
[ 0.022300] VFP support v0.3: implementor 41 architecture 3 part 30 variant 9 rev 4
[ 0.024640] pinctrl core: initialized pinctrl subsystem
[ 0.026025] regulator-dummy: no parameters
[ 0.052242] NET: Registered protocol family 16
[ 0.055370] DMA: preallocated 256 KiB pool for atomic coherent allocations
[ 0.057373] CPU identified as i.MX6Q, silicon rev 1.5
[ 0.077401] vdd1p1: 800 <--> 1375 mV at 1100 mV
[ 0.078396] vdd3p0: 2800 <--> 3150 mV at 3000 mV
[ 0.079327] vdd2p5: 2000 <--> 2750 mV at 2400 mV
[ 0.080392] vddarm: 725 <--> 1450 mV at 1150 mV
[ 0.081389] vddpu: 725 <--> 1450 mV at 1150 mV
[ 0.082388] vddsoc: 725 <--> 1450 mV at 1175 mV
[ 0.099955] hw-breakpoint: found 5 (+1 reserved) breakpoint and 1 watchpoint registers.
[ 0.099970] hw-breakpoint: maximum watchpoint size is 4 bytes.
```

```
[ 0.101827] imx6q-pinctrl 20e0000.iomuxc: Invalid fsl,pins property in node
/soc/aips-bus@02000000/iomuxc@020e0000/imx6qdl-sabresd/pciereggrp

[ 0.102689] imx6q-pinctrl 20e0000.iomuxc: initialized IMX pinctrl driver

[ 0.157038] mxs-dma 110000.dma-apbh: initialized

[ 0.158573] usb_otg_vbus: 5000 mV

[ 0.159250] usb_h1_vbus: 5000 mV

[ 0.159967] wm8962-supply: no parameters

[ 0.160633] MPCIE_3V3: 3300 mV

[ 0.162650] vgaarb: loaded

[ 0.163599] SCSI subsystem initialized

[ 0.164666] usbcore: registered new interface driver usbfs

[ 0.164818] usbcore: registered new interface driver hub

[ 0.165032] usbcore: registered new device driver usb

[ 0.169297] i2c i2c-0: IMX I2C adapter registered

[ 0.181553] i2c i2c-1: IMX I2C adapter registered

[ 0.185248] i2c i2c-2: IMX I2C adapter registered

[ 0.185588] Linux video capture interface: v2.00

[ 0.185917] pps_core: LinuxPPS API ver. 1 registered

[ 0.185936] pps_core: Software ver. 5.3.6 - Copyright 2005-2007 Rodolfo Giometti
<giometti@linux.it>

[ 0.186025] PTP clock support registered

[ 0.187693] Advanced Linux Sound Architecture Driver Initialized.

[ 0.194039] cfg80211: Calling CRDA to update world regulatory domain

[ 0.195940] Switched to clocksource mxc_timer1

[ 0.236262] NET: Registered protocol family 2

[ 0.238522] TCP established hash table entries: 4096 (order: 2, 16384 bytes)

[ 0.238704] TCP bind hash table entries: 4096 (order: 5, 147456 bytes)

[ 0.239965] TCP: Hash tables configured (established 4096 bind 4096)

[ 0.240187] TCP: reno registered

[ 0.240218] UDP hash table entries: 256 (order: 2, 20480 bytes)

[ 0.240408] UDP-Lite hash table entries: 256 (order: 2, 20480 bytes)

[ 0.241732] NET: Registered protocol family 1
```

```
[ 0.243181] RPC: Registered named UNIX socket transport module.
[ 0.243197] RPC: Registered udp transport module.
[ 0.243207] RPC: Registered tcp transport module.
[ 0.243218] RPC: Registered tcp NFSv4.1 backchannel transport module.
[ 0.244845] hw perfevents: enabled with armv7_cortex_a9 PMU driver, 7 counters
available
[ 0.250040] futex hash table entries: 1024 (order: 4, 65536 bytes)
[ 0.278423] VFS: Disk quotas dquot_6.5.2
[ 0.279269] Dquot-cache hash table entries: 1024 (order 0, 4096 bytes)
[ 0.290641] NFS: Registering the id_resolver key type
[ 0.291011] Key type id_resolver registered
[ 0.291026] Key type id_legacy registered
[ 0.291277] jffs2: version 2.2. (NAND) © 2001-2006 Red Hat, Inc.
[ 0.294223] fuse init (API version 7.23)
[ 0.295513] msgmni has been set to 970
[ 0.298531] bounce: pool size: 64 pages
[ 0.298604] io scheduler noop registered
[ 0.298625] io scheduler deadline registered
[ 0.298756] io scheduler cfq registered (default)
[ 0.299681] imx-weim 21b8000.weim: Driver registered.
[ 0.623236] imx6q-pcie 1ffc000.pcie: phy link never came up
[ 0.624206] imx6q-pcie 1ffc000.pcie: PCI host bridge to bus 0000:00
[ 0.624260] pci_bus 0000:00: root bus resource [io 0x1000-0xffff]
[ 0.624277] pci_bus 0000:00: root bus resource [mem 0x01000000-0x01efffff]
[ 0.624295] pci_bus 0000:00: root bus resource [bus 00-ff]
[ 0.626255] PCI: bus0: Fast back to back transfers disabled
[ 0.626882] PCI: bus1: Fast back to back transfers enabled
[ 0.627057] pci 0000:00:00.0: BAR 0: assigned [mem 0x01000000-0x010fffff]
[ 0.627085] pci 0000:00:00.0: BAR 6: assigned [mem 0x01100000-0x0110ffff pref]
[ 0.627113] pci 0000:00:00.0: PCI bridge to [bus 01]
[ 0.628018] pcieport 0000:00:00.0: Signaling PME through PCIe PME interrupt
```

```
[ 0.631618] backlight supply power not found, using dummy regulator
[ 0.636674] imx-sdma 20ec000.sdma: Direct firmware load for imx/sdma/sdma-
imx6q.bin failed with error -2
[ 0.636700] imx-sdma 20ec000.sdma: firmware not found
[ 0.649008] imx-sdma 20ec000.sdma: initialized
[ 0.667564] pfuze100-regulator 1-0008: Full layer: 2, Metal layer: 1
[ 0.669566] pfuze100-regulator 1-0008: FAB: 0, FIN: 0
[ 0.669582] pfuze100-regulator 1-0008: pfuze100 found.
[ 0.673698] SW1AB: 300 <--> 1875 mV at 1375 mV
[ 0.677697] SW1C: 300 <--> 1875 mV at 1375 mV
[ 0.680028] SW2: 800 <--> 3300 mV at 3150 mV
[ 0.682022] SW3A: 400 <--> 1975 mV at 1200 mV
[ 0.684048] SW3B: 400 <--> 1975 mV at 1200 mV
[ 0.686088] SW4: 800 <--> 1975 mV at 1800 mV
[ 0.687729] SWBST: 5000 <--> 5150 mV at 5000 mV
[ 0.691596] VSNVS: 1000 <--> 3000 mV at 3000 mV
[ 0.693599] VREFDDR: 750 mV
[ 0.695604] VGEN1: 800 <--> 1550 mV at 1200 mV
[ 0.697615] VGEN2: 800 <--> 1550 mV at 800 mV
[ 0.699637] VGEN3: 1800 <--> 3300 mV at 2800 mV
[ 0.701656] VGEN4: 1800 <--> 3300 mV at 1800 mV
[ 0.703661] VGEN5: 1800 <--> 3300 mV at 3000 mV
[ 0.707527] VGEN6: 1800 <--> 3300 mV at 1800 mV
[ 0.710035] Serial: IMX driver
[ 0.710854] 2020000.serial: ttyMXC0 at MMIO 0x2020000 (irq = 58, base_baud =
5000000) is a IMX
[ 1.611734] console [ttyMXC0] enabled
[ 1.617938] serial: Freescale lpuart driver
[ 1.623161] [drm] Initialized drm 1.1.0 20060810
[ 1.632198] imx-ipuv3 2400000.ipu: IPUv3H probed
[ 1.639869] imx-ipuv3 2800000.ipu: IPUv3H probed
[ 1.674873] brd: module loaded
```

```
[ 1.694614] loop: module loaded

[ 1.700008] ahci-imx 2200000.sata: fsl,transmit-level-mV not specified, using
00000024

[ 1.707984] ahci-imx 2200000.sata: fsl,transmit-boost-mdB not specified, using
00000480

[ 1.716031] ahci-imx 2200000.sata: fsl,transmit-atten-16ths not specified, using
00002000

[ 1.724228] ahci-imx 2200000.sata: fsl,receive-eq-mdB not specified, using 05000000

[ 1.735410] ahci-imx 2200000.sata: SSS flag set, parallel bus scan disabled

[ 1.742451] ahci-imx 2200000.sata: AHCI 0001.0300 32 slots 1 ports 3 Gbps 0x1 impl
platform mode

[ 1.751289] ahci-imx 2200000.sata: flags: ncq snth stag pm led clo only pmp pio slum
part ccc apst

[ 1.764931] scsi host0: ahci_platform

[ 1.770639] ata1: SATA max UDMA/133 mmio [mem 0x02200000-0x02203fff] port
0x100 irq 71

[ 1.785202] CAN device driver interface

[ 1.791532] 2188000.ethernet supply phy not found, using dummy regulator

[ 1.817968] pps pps0: new PPS source ptp0

[ 1.823040] fec 2188000.ethernet (unnamed net_device) (uninitialized): Invalid MAC
address: 00:00:00:00:00:00

[ 1.833037] fec 2188000.ethernet (unnamed net_device) (uninitialized): Using
random MAC address: de:12:27:d0:c1:58

[ 1.851077] libphy: fec_enet_mii_bus: probed

[ 1.857151] fec 2188000.ethernet eth0: registered PHC device 0

[ 1.864383] ehci_hcd: USB 2.0 'Enhanced' Host Controller (EHCI) Driver

[ 1.870974] ehci-pci: EHCI PCI platform driver

[ 1.875605] ehci-mxc: Freescale On-Chip EHCI Host driver

[ 1.881355] usbcore: registered new interface driver usb-storage

[ 1.901319] ci_hdrc ci_hdrc.1: doesn't support gadget

[ 1.906458] ci_hdrc ci_hdrc.1: EHCI Host Controller

[ 1.911539] ci_hdrc ci_hdrc.1: new USB bus registered, assigned bus number 1

[ 1.935937] ci_hdrc ci_hdrc.1: USB 2.0 started, EHCI 1.00

[ 1.945177] hub 1-0:1.0: USB hub found

[ 1.949219] hub 1-0:1.0: 1 port detected
```

```
[ 1.956907] mousedev: PS/2 mouse device common for all mice
[ 1.964088] egalax_ts 2-0004: Failed to read firmware version
[ 1.969929] egalax_ts: probe of 2-0004 failed with error -5
[ 1.977182] input: st1232-touchscreen as /devices/soc0/soc/2100000.airs-
bus/21a4000.i2c/i2c-1/1-0055/input/input1
[ 1.991591] snvs_rtc 20cc034.snvs-rtc-lp: rtc core: registered 20cc034.snvs-rtc-lp as
rtc0
[ 2.000184] i2c /dev entries driver
[ 2.006696] IR NEC protocol handler initialized
[ 2.011266] IR RC5(x/sz) protocol handler initialized
[ 2.016374] IR RC6 protocol handler initialized
[ 2.020937] IR JVC protocol handler initialized
[ 2.025495] IR Sony protocol handler initialized
[ 2.030204] IR SANYO protocol handler initialized
[ 2.034944] IR Sharp protocol handler initialized
[ 2.039747] IR MCE Keyboard/mouse protocol handler initialized
[ 2.045615] IR XMP protocol handler initialized
[ 2.056460] imx2-wdt 20bc000.wdog: timeout 60 sec (nowayout=0)
[ 2.063088] sdhci: Secure Digital Host Controller Interface driver
[ 2.069323] sdhci: Copyright(c) Pierre Ossman
[ 2.073714] sdhci-pltfm: SDHCI platform and OF driver helper
[ 2.080680] sdhci-esdhc-imx 2194000.usdhc: could not get ultra high speed state,
work on normal mode
[ 2.091082] sdhci-esdhc-imx 2194000.usdhc: No vmmc regulator found
[ 2.097314] sdhci-esdhc-imx 2194000.usdhc: No vqmmc regulator found
[ 2.115934] ata1: SATA link down (SStatus 0 SControl 300)
[ 2.121408] ahci-imx 2200000.sata: no device found, disabling link.
[ 2.127715] ahci-imx 2200000.sata: pass ahci_imx..hotplug=1 to enable hotplug
[ 2.146233] mmc0: SDHCI controller on 2194000.usdhc [2194000.usdhc] using ADMA
[ 2.156540] sdhci-esdhc-imx 2198000.usdhc: No vmmc regulator found
[ 2.162754] sdhci-esdhc-imx 2198000.usdhc: No vqmmc regulator found
[ 2.216007] mmc1: SDHCI controller on 2198000.usdhc [2198000.usdhc] using ADMA
```

```
[ 2.231549] usbcore: registered new interface driver usbhid
[ 2.237180] usbhid: USB HID core driver
[ 2.253321] [drm] Supports vblank timestamp caching Rev 2 (21.10.2013).
[ 2.259993] [drm] No driver support for vblank timestamp query.
[ 2.266547] imx-drm display-subsystem: bound imx-ipuv3-crtc.0 (ops ipu_crtc_ops)
[ 2.274370] imx-drm display-subsystem: bound imx-ipuv3-crtc.1 (ops ipu_crtc_ops)
[ 2.282115] imx-drm display-subsystem: bound imx-ipuv3-crtc.4 (ops ipu_crtc_ops)
[ 2.290013] imx-drm display-subsystem: bound imx-ipuv3-crtc.5 (ops ipu_crtc_ops)
[ 2.298305] imx-hdmi 120000.hdmi: Detected HDMI controller 0x13:0xa:0xa0:0xc1
[ 2.306073] [drm] forcing HDMI-A-1 connector ON
[ 2.310657] imx-drm display-subsystem: bound 120000.hdmi (ops hdmi_ops)
[ 2.318053] imx-drm display-subsystem: bound 2000000.aips-bus:ldb@020e0008
(ops imx_ldb_ops)
[ 2.463612] Console: switching to colour frame buffer device 240x64
[ 2.489662] imx-drm display-subsystem: fb0: frame buffer device
[ 2.497761] imx-drm display-subsystem: registered panic notifier
[ 2.546028] [drm] Initialized imx-drm 1.0.0 20120507 on minor 0
[ 2.561653] mmc1: BKOPS_EN bit is not set
[ 2.577480] mmc1: new DDR MMC card at address 0001
[ 2.583975] mmcblk0: mmc1:0001 P1XXXX 3.60 GiB
[ 2.588833] mmcblk0boot0: mmc1:0001 P1XXXX partition 1 16.0 MiB
[ 2.595044] mmcblk0boot1: mmc1:0001 P1XXXX partition 2 16.0 MiB
[ 2.601267] mmcblk0rpmb: mmc1:0001 P1XXXX partition 3 128 KiB
[ 2.610011] mmcblk0: p1
[ 2.701104] i2c 0-004b: Driver max44009 requests probe deferral
[ 2.729275] wm8962 0-001a: customer id 0 revision D
[ 2.761505] input: WM8962 Beep Generator as /devices/soc0/soc/2100000.aips-
bus/21a0000.i2c/i2c-0/0-001a/input/input2
[ 2.775954] imx-wm8962 sound: wm8962 <-> 202c000.ssi mapping ok
[ 2.790623] TCP: cubic registered
[ 2.795654] NET: Registered protocol family 10
[ 2.803484] sit: IPv6 over IPv4 tunneling driver
```



```
[ 2.810224] NET: Registered protocol family 17
[ 2.814750] can: controller area network core (rev 20120528 abi 9)
[ 2.821146] NET: Registered protocol family 29
[ 2.825632] can: raw protocol (rev 20120528)
[ 2.830041] can: broadcast manager protocol (rev 20120528 t)
[ 2.835759] can: netlink gateway (rev 20130117) max_hops=1
[ 2.842007] Key type dns_resolver registered
[ 2.849068] random: nonblocking pool is initialized
[ 2.855123] Registering SWP/SWPB emulation handler
[ 2.865469] max44009 0-004b: MAX44009: Ambient Light Sensor detected
[ 2.885400] input: gpio-keys as /devices/soc0/gpio-keys/input/input3
[ 2.895434] snvs_rtc 20cc034.snvs-rtc-lp: setting system clock to 1970-01-01
00:00:00 UTC (0)
[ 2.956598] VGEN1: disabling
[ 2.960942] SWBST: disabling
[ 2.965403] SW4: disabling
[ 2.968168] wm8962-supply: disabling
[ 2.971783] usb_otg_vbus: disabling
[ 2.975897] ALSA device list:
[ 2.978907] #0: wm8962-audio
[ 3.329452] kjournald starting. Commit interval 5 seconds
[ 3.331811] EXT3-fs (mmcblk0p1): using internal journal
[ 3.336088] EXT3-fs (mmcblk0p1): recovery complete
[ 3.336102] EXT3-fs (mmcblk0p1): mounted filesystem with ordered data mode
[ 3.336439] VFS: Mounted root (ext3 filesystem) on device 179:1.
[ 3.340177] devtmpfs: mounted
[ 3.341169] Freeing unused kernel memory: 356K (8091b000 - 80974000)
INIT: version 2.88 booting
Starting udev
[ 4.032334] udevd[109]: starting version 182
bootlogd: cannot allocate pseudo tty: No such file or directory
```

```

Thu Apr  9 07:18:59 UTC 2015

INIT: Entering runlevel: 5

Configuring network interfaces... [   6.268948] fec 2188000.ethernet eth0: Freescale
FEC PHY driver [Atheros 8031 ethernet] (mii_bus:phy_addr=2188000.ethernet:01, irq=-
1)

[   6.281939] IPv6: ADDRCONF(NETDEV_UP): eth0: link is not ready

udhcpd (v1.22.1) started

Sending discover...

Sending discover...

Sending discover...

No lease, forking to background

done.

Starting syslogd/klogd: done


Poky (Yocto Project Reference Distro) 1.7.1 imx6qvis /dev/ttyMXC0


imx6qvis login: root
root@imx6qvis: ~#

```

6.4 Boot with LVDS display

By default the WISE Board boots onto HDMI display. To boot onto LCD display, follow the below procedure:

- Attach the LCD display to WISE Board
- Power-on the board and press any key before kernel image starts loading
- Change the boot arguments as below in the u-boot

6.4.1 To boot from SD card

```

=> setenv load_addr 0x18000000

=> setenv bootargs_base 'setenv bootargs console=ttyMXC0,115200
loglevel=8'

=> setenv bootargs_mmc 'setenv bootargs ${bootargs}
root=/dev/mmcblk0p1 rootwait rw video=LVDS-1:800x480
no_console_suspend'

```

```
=> setenv bootcmd_mmc 'run bootargs_base bootargs_mmc; ext2load mmc 0
${load_addr} boot/mx6vise.itb; bootm ${load_addr}#config@2'

=> setenv bootcmd 'run bootcmd_mmc'

=> run bootcmd
```

6.4.2 To boot from EMMC

```
=> setenv load_addr 0x18000000

=> setenv bootargs_base 'setenv bootargs console=ttyMxc0,115200
loglevel=8'

=> setenv bootargs_mmc 'setenv bootargs ${bootargs}
root=/dev/mmcblk0p1 rootwait rw video=LVDS-1:800x480
no_console_suspend'

=> setenv bootcmd_mmc 'run bootargs_base bootargs_mmc; ext2load mmc 1
${load_addr} boot/mx6vise.itb; bootm ${load_addr}#config@2'

=> setenv bootcmd 'run bootcmd_mmc'

=> run bootcmd
```

Chapter 7

TESTING INTERFACES

7 Interface Tests

7.1 Testing Audio

- Connect the Headphone's audio jack on J1 port of VISE Board / or Carrier Module of the VISE Board
- Connect the Headphone's mic jack on J2 port of VISE Board / or Carrier Module of the VISE Board
- Connect the Right and Left speakers on J7 port of VISE Board / or Carrier Module of the VISE Board
- Copy the sample audio files (wav format) into the SD card's home directory.
- Insert the SD card on board.
- Power ON the board.
- Boot the board.
- Login as 'root' in filesystem.

7.1.1 Testing Audio Playback

- Execute the following commands to playback audio via headphone.

To enable headphone path:

```
$ amixer cset numid=25 on
```

To play audio:

```
$ aplay -c 2 -t raw -r 48000 /home/sample.wav
```

To disable headphone:

```
$ amixer cset numid=25 off
```

- Increase and decrease playback volume by the following command

```
$ amixer cset numid=24 <value>
```

value – should be 0 to 127

0 – mute; 127 – maximum

For example,

```
$ amixer cset numid=24 120
```

- Execute the following command to playback audio via speakers.

To enable speakers:

```
$ amixer cset numid=62 on
```

To play audio:

```
$ aplay -c 2 -t raw -r 48000 /home/sample.wav
```

To disable speakers:

```
$ amixer cset numid=62 off
```

- Increase and decrease playback volume by the following command

```
$ amixer cset numid=61 <value>
```

value – should be 0 to 127

0 – mute; 127 – maximum

For example,

```
$ amixer cset numid=61 120
```

7.1.2 Testing Audio Record from AMIC

- Execute the following command to record audio from AMIC

```
$ arecord -c 2 -t raw -r 48000 /home/record.wav
```

- Input should be given immediately after this command.
- Press 'Ctrl + c' to stop recording.
- Recorded file will be stored as record.wav in /home directory.
- Playback the audio through headphone or speaker as explained in section 9.1.1

```
$ aplay -c 2 -t raw -r 48000 /home/record.wav
```

- Increase and decrease capture volume by the following command

```
$ amixer cset numid=8 <value>
```

value – should be 0 to 127

0 – mute; 127 – maximum

For example,

```
$ amixer cset numid=8 120
```

7.1.3 Testing Headphone and Microphone detect

- Insert Headphone on J1 port of VISE Board / or Carrier Module of the VISE Board
- To check the headphone status,

```
$ cat /sys/bus/soc/devices/soc0/sound/headphone
```

- Remove the headphone from the port and check the status.

```
$ cat /sys/bus/soc/devices/soc0/sound/headphone
```

- Insert Microphone on J2 port of VISE Board / or Carrier Module of the VISE Board
- To check the mic status,

```
$ cat /sys/bus/soc/devices/soc0/sound/mic
```

- Remove the mic from the port and check the status,

```
$ cat /sys/bus/soc/devices/soc0/sound/mic
```

7.2 Testing OTG

- Copy the usb otg modules into the SD card's home directory.
- Insert SD card.
- Power ON the board.
- Boot the board.
- Login as 'root' in filesystem.
- Insert usb otg modules by following commands.

```
$ cd /home/modules
```

```
$ insmod kernel/fs/configfs/configfs.ko
```

```
$ insmod kernel/drivers/usb/gadget/libcomposite.ko
```

```
$ insmod kernel/drivers/usb/gadget/function/usb_f_mass_storage.ko
```

7.2.1 Testing OTG in Device mode

- Connect OTG cable from Host PC to J2 port of VISE Board / or Core Module of the VISE Board
- Execute the below command to enable otg in device mode

```
$ insmod kernel/drivers/usb/gadget/legacy/g_mass_storage.ko  
file=/dev/mmcblk0p1 stall=no removable=yes
```

- Now SD card will be mounted into the Host PC.
- Read/Write from/to the SD card should be checked.
- Execute the command to come out from the otg device mode

```
$ rmmod kernel/drivers/usb/gadget/legacy/g_mass_storage.ko
```

- Disconnect the OTG cable.

Note: To test OTG device mode, Linux based PC is required

7.2.2 Testing OTG in Host mode

- Connect the USB Type A Female to Micro A Male cable to J2 port of VISE Board / or Core Module of the VISE Board
- Connect pendrive on the other side of OTG cable.
- Check on which logical drive the pendrive is mounted. Ex-sda or sdb etc
- Execute the below command to enable otg in device mode

```
$ mount /dev/sda1/ <directory>
```

- For example,
\$ **mount /dev/sda1 /mnt**
- Now pendrive will be mounted onto the mx6 vise board's filesystem.
- Read/Write from/to the pendrive should be checked.
- Execute the command to come out from the otg host mode.

```
$ umount /dev/sda1
```

- Disconnect the OTG cable.

7.3 Testing USB

- Connect USB stick on J4 port of VISE Board / or Carrier Module of the VISE Board
- Detection message should be displayed on console.
- Mount the USB stick on /mnt directory.

```
$ mount /dev/<partition> /mnt
```

For example,

```
$ mount /dev/sda1 /mnt
```

- Change the directory to the mount location.
- Read and Write files to it and check the stability of the newly written or modified files after several mounting trials.

```
$ cd /mnt  
$ ls  
$ touch test.txt  
$ echo "Hello" > test.txt  
$ cat test.txt
```

- Unmount the USB stick.

```
$ cd /  
$ umount /mnt
```

7.4 Testing Battery

- Connect battery to the VISE Board.
- To enable battery charging,

```
$ echo 1 >  
/sys/class/power_supply/bq24167_charger/device/charger_enable
```

- Check the battery status now. It should be in '*charging*' state.

```
$ cat /sys/class/power_supply/bq24167_charger/device/charger_status
```

- To disable battery charging,

```
$ echo 0 >  
/sys/class/power_supply/bq24167_charger/device/charger_enable
```

- Check the battery status now. It should be in '*discharging*' state.

```
$ cat /sys/class/power_supply/bq24167_charger/device/charger_status
```

- Check the battery status by switching ON and OFF the main power supply as well as via USB power.

7.5 Testing 9-Axis sensor

- Execute the `inv_mpu9150_test.sh` application to test the 9-axis sensor.
- Tilt the board for different directions and check the changes in x, y & z axis values.

```
$ inv_mpu9150_test.sh
```

7.6 Testing Backlight

- Connect LCD backlight panel as described in section 4.1
- To enable backlight,


```
$ echo 0 > /sys/class/backlight/backlight/bl_power
```

- To get the default brightness value,

```
$ cat /sys/class/backlight/backlight/brightness
```

- To check the maximum brightness,

```
$ cat /sys/class/backlight/backlight/brightness
```

- To set the brightness,

```
$ echo n > /sys/class/backlight/backlight/brightness
```

n – 0 to 7; 0 is OFF ; 7 is max brightness.

- To switch OFF the panel,

```
$ echo 1 > /sys/class/backlight/backlight/bl_power
```

[or]

```
$ echo 0 > /sys/class/backlight/backlight/brightness
```

7.7 Testing Touchscreen panel

- Connect LCD touch screen panel as described in section 4.1
- Run 'evtest' application to test touch panel.
- Test single and multi touch.

```
$ evtest <touchscreen_device>
```

For example,

```
$ evtest /dev/input/event0
```

7.8 Testing LCD

- Connect the LCD panel as described in section 4.1
- Enable backlight as described in section 7.6
- Execute the below command.

```
$ cat /home/lcd_image.omap16 > /dev/fb0
```

- Image should be displayed without any issue.

Note: Currently tested with 800x480 LCD panel

7.9 Testing Gpio-Keys

- Execute evtest with the device entry.

```
$ evtest <device_entry>
```

For ex,

```
$ evtest /dev/input/event2
```

- Press and release the Volume Up and Volume down buttons and check the output value from evtest application.

Note: Processor On/Off switch is not working

7.10 Testing HDMI

- Connect the HDMI display and cable as described in section 5.6
- Execute the below command.

```
$ cat /home/hdmi_image.omap16 > /dev/fb0
```

- Image should be displayed without any issue.

Note: Tested and works with 1920x1080 image resolution

7.11 Testing Ethernet

- Connect the Ethernet cable to the target board Ethernet port.
- Use the ping command to test the connection

```
$ ping <ip address>
```

For example,

```
ping 192.168.13.1
```

7.12 Testing Light Sensor

- Execute the als_max44009_test.sh application to test the ALS. Lux values will be displayed.
- Cover the sensor with hand to change the light intensity incident on ALS. The LUX values will vary.

```
$ als_max44009_test.sh
```

7.13 Testing IO Expander

7.13.1 Test method 1

- Execute the *evtest* command to test the IO Expander

```
$ evtest /dev/input/event2
```

- Press the IO expander switches SW1 and SW2
- Console should display the event key code and switch on/off value.

7.13.2 Test method 2

- Execute the below sysfs entry to test the IO expander test for LED1

```
$ echo 1 > /sys/class/leds/expander-led1/brightness
```

- IO expander LD1 should turn on

```
$ echo 0 > /sys/class/leds/expander-led1/brightness
```

- IO expander LD1 should turn off

- Execute the below sysfs entry to test the IO expander test for LED2

```
$ echo 1 > /sys/class/leds/expander-led2/brightness
```

- IO expander LD2 should turn on

```
$ echo 0 > /sys/class/leds/expander-led2/brightness
```

- IO expander LD2 should turn off

7.13.3 Test method 3

- To toggle IO expander Pin 1

```
$ echo 504 > /sys/class/gpio/export
$ echo out > /sys/class/gpio/gpio504/direction
$ echo 1 > /sys/class/gpio/gpio504/value
$ echo 0 > /sys/class/gpio/gpio504/value
$ echo 504 > /sys/class/gpio/unexport
```

- To toggle IO expander Pin 2

```
$ echo 505 > /sys/class/gpio/export
```

```
$ echo out > /sys/class/gpio/gpio505/direction
$ echo 1 > /sys/class/gpio/gpio505/value
$ echo 0 > /sys/class/gpio/gpio505/value
$ echo 505 > /sys/class/gpio/unexport
```

- To toggle IO expander Pin 3

```
$ echo 506 > /sys/class/gpio/export
$ echo out > /sys/class/gpio/gpio506/direction
$ echo 1 > /sys/class/gpio/gpio506/value
$ echo 0 > /sys/class/gpio/gpio506/value
$ echo 506 > /sys/class/gpio/unexport
```

7.14 Testing RTC

Execute the following commands to test RTC

Set the system time to current time using date command

```
$ date --set="hh:mm:ss"
```

For example,

```
$ date --set="10:00:00"
```

Write the system time to rtc

```
$ hwclock --systohc
```

Power down the system and power it on.

Issue date command to see if the value is retained

```
$ date
```

7.15 Testing LEDs

Execute the following commands to test LED2

```
$ echo 9 > /sys/class/gpio/export
$ echo out > /sys/class/gpio/gpio9/direction
```

For example,

To turn on LED

```
$ echo 1 > /sys/class/gpio/gpio9/value
```

To turn off LED

```
$ echo 0 > /sys/class/gpio/gpio9/value
```

```
$ echo 9 > /sys/class/gpio/unexport
```

8 Acronyms

Table 3: Acronyms

Acronyms	Description
EVM	Evaluation Module
SD	Secure Digital
MMC	Multi Media Card
ESD	Electro-static Discharge
RAM	Random Access Memory
GB	Giga byte
HDMI	High Definition multimedia Interface
USB	Universal Serial Bus
OTG	On-The-Go
ALSA	Advanced Linux Sound Architecture
LCD	Liquid Crystal Display
RGBA	Red Green Blue Alpha
DOS	Disk Operating System
eMMC	Embedded Multi Media Card
GPIO	General purpose Input Output
RTC	Real Time Clock

9 References

List all reference documents.

- i.MX_6_BSP_Porting_Guide.pdf

10 Support Information

10.1 Contact

In case of questions contact Mistral Solutions Pvt. Ltd.

Mistral homepage: **www.mistralsolutions.com**

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